

PAGE: 1

RAW SEQUENCE LISTING
PATENT APPLICATION US/09/502,426DATE: 03/01/2000
TIME: 16:40:56

Input Set: I502426.RAW

This Raw Listing contains the General Information
Section and up to first 5 pages.

ENTERED

```
1 <110> APPLICANT: AZPIROZ, Ricardo
2     CHOE, Sunghwa
3     FELDMANN, Kenneth
4 <120> TITLE OF INVENTION: DWF4 POLYNUCLEOTIDES, POLYPEPTIDES AND USES THEREOF
5 <130> FILE REFERENCE: 2225-0001
6 <140> CURRENT APPLICATION NUMBER: US/09/502,426
7 <141> CURRENT FILING DATE: 2000-02-11
8 <150> EARLIER APPLICATION NUMBER: 60/119,657
9 <151> EARLIER FILING DATE: 1999-02-11
10 <150> EARLIER APPLICATION NUMBER: 60/119,658
11 <151> EARLIER FILING DATE: 1999-02-11
12 <160> NUMBER OF SEQ ID NOS: 18
13 <170> SOFTWARE: PatentIn Ver. 2.0
14 <210> SEQ ID NO 1
15 <211> LENGTH: 6888
16 <212> TYPE: DNA
17 <213> ORGANISM: Arabidopsis sp.
18 <400> SEQUENCE: 1
19     atgtgggtat tatattgttg gggtcggttt gagctacaat ataaatttcg tgtttctggt 60
20     tattctgttc acatgatttg agtttggttc tcaatttgga ttccaagata attaaatatt 120
21     aaaattcatt taaaatattt acaagtaatt aattatcttt acattgtatt gttataacaa 180
22     aatatctatc tttggtatat gagaaaatat ggagtttgga atttataata ataaaggaaa 240
23     taatcgattc catttggttg gattacacag ttaagttttt gtgtttcttt tgttatatgt 300
24     atatgagtaa atcaaaaaga gtattgattg aagtgtaaac atatttcgtt atgaccccca 360
25     aaaaaaaaaa aaaaacaaac aaacaaaccc ccccccgat atagtttttg gttctggatt 420
26     aggtttatth gatcataatt acatgcatca tttctttgat tactatgaag attttcttac 480
27     caattaaaat ttcgaattca tatctcttga ttattaaatt aaatacgagt gtgaatatcc 540
28     gtttatcgat cactccaatc atgattatga ttcttgtgct aatccagcaa attattaaca 600
29     agagtattga gaaaaaacgg aaaataagaa aagggaaaga gtagtgaccc atggagtatg 660
30     tgaataatta tcaaagagaa taagagatga caaccaaag gttgtggaat aatggtcctt 720
31     gccagctttc tctcacaatc aatatcgacc ctatttggat tttctggata ttcgttaaaa 780
32     tttgcgataa cgattgtgaa aaatatttta tttgttagct gatctcaata ttatgttcca 840
33     ggtatttgca taatcttctg tttaaagcat attttgcctt tctttttggt tcgtttctct 900
34     taactatata ttatcgcgga tatatgataa caatgatata tcacaaaaca attgtctggg 960
35     accattttga ataaactttt tctcaaacat tacgggacac tggactcgac ccttaaaata 1020
36     cgattttaca gcgtcactag ttgagattac tagcataaag cataaaggac ccgttcaagc 1080
37     tattttataa aagttacaaa ctgaatatag cttgaaatcc tttagaaaat tttggaatta 1140
38     ccggttggtt tgtaaatata gatttagtgg taaacaaata tgtaaatcaa ttagtggtca 1200
39     acatatacat aattccttac agaaaaaaca aacttaagag aagttaacat atccatatat 1260
40     gggtagtcta tacctttcac gtatgctata cttagagacta aagaatagtt atgtgatgtc 1320
41     gataaatgaa attcacacgc gtggttaataa ttatgggacc gtatgttacg atcactgcaa 1380
42     atatcattct tggttggtca acaataaaaa caaaaacaag aaaaaagaa aacgattttt 1440
43     cttggattcc attcaatgat ctaaaatgca tagatctttt gggttacagt ttcgaagtcc 1500
44     tctacaagcg tgtaaccatc tgcaactatt aaattgcttt ctttaatgca tctttaacat 1560
```

PAGE: 2

RAW SEQUENCE LISTING PATENT APPLICATION US/09/502,426

DATE: 03/01/2000
TIME: 16:40:56

Input Set: I502426.RAW

```

45      atttattgtt agttggaatt taataagagc gaacttgtaa cattacaata tttatattag 1620
46      atactagtat gtgattatct caaatacata ctttgatgt ttaaacttaa tcttgtttct 1680
47      tcctacggta taaatattaa tcatcgaggt aaaaaaagtt ttgtcttatt ttcgcgatgc 1740
48      atgaaggata aacctaattga ctttaatttt ttgaaaatgt aaccctttta ctcatagatt 1800
49      aattaccgta tgtttttgtt gccataatga cagcctctac aactgtgata gtcaattttt 1860
50      tctgcaaata ttaaattagg aattcaatgc tactatcaat agaagaaaca gctgagtatt 1920
51      acattttaat ttaaagacaa aatttttgaa aaatgttata atttctaaca atattattaa 1980
52      aatatgatgc ctataatgta tttcctatgt tcttaaaata ttttttttta tatttagtta 2040
53      taaatacatt atgaaccaat aatagttggt gaattcaaat atctccatta atattttttg 2100
54      aaatctacaa attattaata tttagtcaat aacaatgcat agaaagtctc aaaaaaatt 2160
55      ttgttaacag aaacttccaa attttttttt tttatggaac aagaaataac agatagaaaa 2220
56      ctattttgtt gtggaatgga agtagtaata tacattaagc aaattttaaa aaattatata 2280
57      agcctatacg cgctcaaagt atgttatcta gtaggtgtaa ttaataatgc atgggtcgat 2340
58      tcagaattgg gacaacaatg aaaacggaat taaaatatta actttaaaat aaataaaaaat 2400
59      ttgagtaaatt gtgttttctg actattgagg ggcaaaaaaa agacaatgcc aaaagtctac 2460
60      gggtttgact gtccagttcg gtaataatct aataactctg tctttgaccg cacgctcggt 2520
61      taggggtcct tctgacattt tcaactgtct acccctactc gtgagcccac cttttccca 2580
62      tatectaagg gtaatttttg aaatcccaat ttaaacgat tgagaccgta ccggacttcc 2640
63      tgggattctg ctggagcatt tatcaaaaat tattagcacg aatgggttta ttaatttaaa 2700
64      aactcacaac ttgatcagat aaaatttcat aaacactttt acgatggatt cgtacgatct 2760
65      atctaattgac tttttttttt ctaccacggt ggatgaaagt tatagtacta ttagccagag 2820
66      acaattgatt atagatatat ccattaatcc atgatattta tgatataaat agctgttaaa 2880
67      ctatttcagc atcgcagctt tctgcaactt ttgtttttta ttaagagatt taataaataa 2940
68      aagtattaaa aggagcataa cgaggcaaca aaagtaatga acacggagaa acaaaagcca 3000
69      tgaagctcat tggtagttt aagcttaata agaagatttt attaaatttt aatgacgatg 3060
70      ataacaatta tttttctgta cttcttttaa acccctctt acaaacagaa gtcctcttt 3120
71      tcagtagaag tccgattccc aatcttaaag acaaagccat tagaaagaga aagtgaagta 3180
72      gagagagaga gaaactagct ccattgttga aacagagcat catactctct tacctctct 3240
73      tcttctccca tcgcttttgt ctcttctctt cttcttgatt ctcttgaaga gaagaaatag 3300
74      aaaaaccaga ttcaatctac ctccgggtta atccgggttg ccatttcttg gtgaaacat 3360
75      cggttatctt aaaccgtaca ccgccacaac actcgggtgac ttcatgcaac aacatgtctc 3420
76      caagtaaaca acaacatctt ccaaaaactc aaaaaataa atcctctgtt tttgaaattt 3480
77      gactaatgtt gttattttta caggtatggt aagatatata gatcgaactt gtttgagaa 3540
78      ccaacgatcg tatcagctga tgctggactt aatagattca tattacaaaa cgaaggaagg 3600
79      ctctttgaat gtagttatcc tagaagtata ggtgggattc ttgggaaatg gtcgatgctt 3660
80      gttcttggtg gtgacatgca tagagatatg agaagtatct cgcttaactt cttaagtcac 3720
81      gcacgtctta gaactattct acttaaagat gttgagagac atactttgtt tgttcttgat 3780
82      tcttggaac aaaactctat tttctctgct caagacgagg ccaaaaaggt tttattttt 3840
83      atcttttatt ttgctaaatt tttttgttta tgaatcttta gagtttctaa ctttttttt 3900
84      ttaattgaa cagtttacgt ttaatctaatt ggcaagcat ataattgagta tggatcctgg 3960
85      agaagaagaa acagagcaat taaagaaaga gtatgtaact ttcatgaaag gagttgtctc 4020
86      tgctcctcta aatctaccag gaactgttta tcataaagct cttcaggtac atttattttt 4080
87      ttttgctgta aagtcacaaa ctctcattat aggtttttta ttttatttta tgtgttaaat 4140
88      aaaatatcta aaatggttgt gtagtcacga gcaacgatat tgaagttcat tgagaggaaa 4200
89      atggaagaga gaaaattgga tatcaaggaa gaagatcaag aagaagaaga agtgaaaaca 4260
90      gaggatgaag cagagatgag taagagtgat catgttagga aacaaagaac agacgatgat 4320
91      cttttgggat gggttttgaa acattcgaat ttatcgacgg agcaaattct cgatctcatt 4380
92      cttagtttgt tatttgccgg acatgagact tcttctgtag ccattgctct cgctatcttc 4440
93      ttcttgcaag cttgccctaa agcgttgaa gagcttaggg taagataatt ataacagcac 4500
94      aagttaatta ctaccaaat gttacgtatt atataagtta ttatagaatt attctattag 4560

```

PAGE: 3

RAW SEQUENCE LISTING
PATENT APPLICATION US/09/502,426

DATE: 03/01/2000
TIME: 16:40:56

Input Set: I502426.RAW

```

95      aatatacgat gaaaaaagta tgtatatatta attgtcacta attttatgtt tattgattta 4620
96      tacttttgaa ggaagagcat cttgagatcg cgagggccaa gaaggaacta ggagagtcag 4680
97      aattaaattg ggatgattac aagaaaatgg actttactca atgtgtatgt tactatcatt 4740
98      ctcatatttt attctatgtt catatgattt atgatgaaac caaaattatt gatttttttt 4800
99      ttggtgtgtg tgaaggttat aaatgaaact cttcgattgg gaaatgtagt taggtttttg 4860
100     catcgcaaag cactcaaaga tgttcggtac aaaggtaaaa ctttacgtac aaaattttta 4920
101     aataatgaaa tccggaatat tgaaatctta ttggatgaaa aatattaaaa taatttacat 4980
102     ttcttaaatgt tggaaaaaag gatacgatat ccctagtggg tggaaagtgt taccggtgat 5040
103     ctcagccgta cttttggata attctcgta tgaccaacct aatctcttta atccttgag 5100
104     atggcaacag gtaataaaaa agtttctctc gttaactatc gaaaattagt gtatagtttt 5160
105     ttcacttatt gcatgaatag atacgtccta cgtgatttac ctatctatag atactatacg 5220
106     agaactatta atctggcaaa aactttttat tattattatc tttcaagtta gatcttaaca 5280
107     cgtcatggat cattgatcac atgaaagcat ataaattaaa aataagagag agaaagagac 5340
108     gtgttggtgt aagtgtacgt gaagacaatt aattagtagg atggtatgtc tttaatgacg 5400
109     taggagctgc ctaaataattc ttataatcgt gaccgttgat ttattattag tcacggcttt 5460
110     gatacaattt aagatttgac ggacgatggg accacggctt tgacggatct cacacgcccg 5520
111     atgacttgta cgtgcttag attctgccac gttgactggg ttttaacttt agatttataa 5580
112     ctctattaat tataacaact atcaaatcgg cgaattagag aaatatacta tatagtatta 5640
113     ttatgattat tatgagataa tactttatga aataagataa taatggtagt catgatgtta 5700
114     tagtgagtgg ggaaggtaag aggtggtgag agatgattaa tgacccacg tgggtgtggtg 5760
115     ccaacaagca cgtgttcttc ttcttttttt cttcccaact tctttttttg ggggtttatt 5820
116     gtgatttata aaatcggttt gtcgtttttt tttgtgacga gcagcaaaac aacggagcgt 5880
117     catcgtcagg aagtggtagt ttttcgacgt ggggaaacaa ctacatgccg tttggaggag 5940
118     ggccaaggct atgtgctggt tcagagctag ccaagttaga aatggcagtg tttattcatc 6000
119     atctagttct taaattcaat tgggaattag cagaagatga tcaaccattt gcttttcttt 6060
120     ttgttgattt tcctaacggt ttgcctatta gggtttctcg tattctgtaa aaaaaaaaaa 6120
121     agatgaaagt atttttattc tcttcttttt tttttgataa ttttaaatca ttttttttgc 6180
122     ccaatgatat ataaaaattt ggataaataa tattattgga tattcgtttt ttagttcggg 6240
123     tttgagaaaa gggtttcgac tttcgaaagt ggacgatgta tatagattgg gagctagggt 6300
124     gagtctttgg acatttgtat tggatgttgt tgattattag tgtcgacact attaaacctt 6360
125     aaatgggctt tctataaggc ccaattatat tacgattata acaaagtgac aacttttact 6420
126     tcgtttttga tccgaagcaa taacaaattg tcaaatacca aacacaagaa ttatgtaaac 6480
127     actcgtgtgt gtctagtggg aaatcattgg gctggagact gaacatcaga acacaagaaa 6540
128     cctgtcaatt atggatacac ctctatgac ggtttccaaa ctttatcttg attcttatcg 6600
129     tgttacattg acacaaagag ttaggtgtca aaaggactaa atgaataaca atagctctca 6660
130     ggataagaag gttcataaaa tggtttcttt attttgagaa gaaagagaga ggagctttta 6720
131     ctgtttcttg ggtcctattc ctttaaatga gagggtttcg tttttacttc ttctatctca 6780
132     tcacttttag gatcctcttc tagacgagta aagtaatcct cgttaccaag caatggtctc 6840
133     atcttttgaa gacaggtctt ttccaagtcc tagttcaggc caaagctt 6888

```

<210> SEQ ID NO 2

<211> LENGTH: 513

<212> TYPE: PRT

<213> ORGANISM: Arabidopsis sp.

<400> SEQUENCE: 2

```

139      Met Phe Glu Thr Glu His His Thr Leu Leu Pro Leu Leu Leu Leu Pro
140      1              5              10              15
141      Ser Leu Leu Ser Leu Leu Leu Phe Leu Ile Leu Leu Lys Arg Arg Asn
142      20              25              30
143      Arg Lys Thr Arg Phe Asn Leu Pro Pro Gly Lys Ser Gly Trp Pro Phe
144      35              40              45

```

PAGE: 4

RAW SEQUENCE LISTING
PATENT APPLICATION US/09/502,426

DATE: 03/01/2000
TIME: 16:40:56

Input Set: I502426.RAW

145	Leu	Gly	Glu	Thr	Ile	Gly	Tyr	Leu	Lys	Pro	Tyr	Thr	Ala	Thr	Thr	Leu
146		50					55					60				
147	Gly	Asp	Phe	Met	Gln	Gln	His	Val	Ser	Lys	Tyr	Gly	Lys	Ile	Tyr	Arg
148		65				70					75					80
149	Ser	Asn	Leu	Phe	Gly	Glu	Pro	Thr	Ile	Val	Ser	Ala	Asp	Ala	Gly	Leu
150					85					90					95	
151	Asn	Arg	Phe	Ile	Leu	Gln	Asn	Glu	Gly	Arg	Leu	Phe	Glu	Cys	Ser	Tyr
152				100					105					110		
153	Pro	Arg	Ser	Ile	Gly	Gly	Ile	Leu	Gly	Lys	Trp	Ser	Met	Leu	Val	Leu
154			115					120					125			
155	Val	Gly	Asp	Met	His	Arg	Asp	Met	Arg	Ser	Ile	Ser	Leu	Asn	Phe	Leu
156		130					135					140				
157	Ser	His	Ala	Arg	Leu	Arg	Thr	Ile	Leu	Leu	Lys	Asp	Val	Glu	Arg	His
158		145				150					155					160
159	Thr	Leu	Phe	Val	Leu	Asp	Ser	Trp	Gln	Gln	Asn	Ser	Ile	Phe	Ser	Ala
160					165					170					175	
161	Gln	Asp	Glu	Ala	Lys	Lys	Phe	Thr	Phe	Asn	Leu	Met	Ala	Lys	His	Ile
162				180					185					190		
163	Met	Ser	Met	Asp	Pro	Gly	Glu	Glu	Glu	Thr	Glu	Gln	Leu	Lys	Lys	Glu
164			195					200					205			
165	Tyr	Val	Thr	Phe	Met	Lys	Gly	Val	Val	Ser	Ala	Pro	Leu	Asn	Leu	Pro
166		210					215					220				
167	Gly	Thr	Ala	Tyr	His	Lys	Ala	Leu	Gln	Ser	Arg	Ala	Thr	Ile	Leu	Lys
168		225				230					235					240
169	Phe	Ile	Glu	Arg	Lys	Met	Glu	Glu	Arg	Lys	Leu	Asp	Ile	Lys	Glu	Glu
170					245					250					255	
171	Asp	Gln	Glu	Glu	Glu	Glu	Val	Lys	Thr	Glu	Asp	Glu	Ala	Glu	Met	Ser
172				260					265					270		
173	Lys	Ser	Asp	His	Val	Arg	Lys	Gln	Arg	Thr	Asp	Asp	Asp	Leu	Leu	Gly
174			275					280					285			
175	Trp	Val	Leu	Lys	His	Ser	Asn	Leu	Ser	Thr	Glu	Gln	Ile	Leu	Asp	Leu
176		290					295					300				
177	Ile	Leu	Ser	Leu	Leu	Phe	Ala	Gly	His	Glu	Thr	Ser	Ser	Val	Ala	Ile
178		305				310					315					320
179	Ala	Leu	Ala	Ile	Phe	Phe	Leu	Gln	Ala	Cys	Pro	Lys	Ala	Val	Glu	Glu
180					325					330					335	
181	Leu	Arg	Glu	Glu	His	Leu	Glu	Ile	Ala	Arg	Ala	Lys	Lys	Glu	Leu	Gly
182				340					345					350		
183	Glu	Ser	Glu	Leu	Asn	Trp	Asp	Asp	Tyr	Lys	Lys	Met	Asp	Phe	Thr	Gln
184			355				360					365				
185	Cys	Val	Ile	Asn	Glu	Thr	Leu	Arg	Leu	Gly	Asn	Val	Val	Arg	Phe	Leu
186		370					375					380				
187	His	Arg	Lys	Ala	Leu	Lys	Asp	Val	Arg	Tyr	Lys	Gly	Tyr	Asp	Ile	Pro
188		385				390					395					400
189	Ser	Gly	Trp	Lys	Val	Leu	Pro	Val	Ile	Ser	Ala	Val	His	Leu	Asp	Asn
190				405						410				415		
191	Ser	Arg	Tyr	Asp	Gln	Pro	Asn	Leu	Phe	Asn	Pro	Trp	Arg	Trp	Gln	Gln
192				420					425					430		
193	Gln	Asn	Asn	Gly	Ala	Ser	Ser	Ser	Gly	Ser	Gly	Ser	Phe	Ser	Thr	Trp
194			435					440					445			

PAGE: 5

RAW SEQUENCE LISTING
PATENT APPLICATION US/09/502,426

DATE: 03/01/2000
TIME: 16:40:56

Input Set: I502426.RAW

```

195      Gly Asn Asn Tyr Met Pro Phe Gly Gly Gly Pro Arg Leu Cys Ala Gly
196          450                      455                      460
197      Ser Glu Leu Ala Lys Leu Glu Met Ala Val Phe Ile His His Leu Val
198          465                      470                      475                      480
199      Leu Lys Phe Asn Trp Glu Leu Ala Glu Asp Asp Gln Pro Phe Ala Phe
200                      485                      490                      495
201      Pro Phe Val Asp Phe Pro Asn Gly Leu Pro Ile Arg Val Ser Arg Ile
202                      500                      505                      510
203      Leu
204      <210> SEQ ID NO 3
205      <211> LENGTH: 24
206      <212> TYPE: DNA
207      <213> ORGANISM: Artificial Sequence
208      <220> FEATURE:
209      <223> OTHER INFORMATION: Description of Artificial Sequence: primer D4OVERF
210      <400> SEQUENCE: 3
211          atgttcgaaa cagagcatca tact                                24
212      <210> SEQ ID NO 4
213      <211> LENGTH: 21
214      <212> TYPE: DNA
215      <213> ORGANISM: Artificial Sequence
216      <220> FEATURE:
217      <223> OTHER INFORMATION: Description of Artificial Sequence: primer D4PRM
218      <400> SEQUENCE: 4
219          cctcgatcaa agagagagag a                                21
220      <210> SEQ ID NO 5
221      <211> LENGTH: 29
222      <212> TYPE: DNA
223      <213> ORGANISM: Artificial Sequence
224      <220> FEATURE:
225      <223> OTHER INFORMATION: Description of Artificial Sequence: primer D4RTF
226      <400> SEQUENCE: 5
227          ttcttggtga aaccatcggt tatcttaaa                        29
228      <210> SEQ ID NO 6
229      <211> LENGTH: 26
230      <212> TYPE: DNA
231      <213> ORGANISM: Artificial Sequence
232      <220> FEATURE:
233      <223> OTHER INFORMATION: Description of Artificial Sequence: primer D4RTR
234      <400> SEQUENCE: 6
235          tatgataagc agttcctggt agattt                            26
236      <210> SEQ ID NO 7
237      <211> LENGTH: 21
238      <212> TYPE: DNA
239      <213> ORGANISM: Artificial Sequence
240      <220> FEATURE:
241      <223> OTHER INFORMATION: Description of Artificial Sequence: primer D4F1
242      <400> SEQUENCE: 7
243          cgaggcaaca aaagtaatga a                                21
244      <210> SEQ ID NO 8

```

Please Note:

Please ensure that all subsequent artificial sequences have a suitable explanation in the <220> - <223> section.

PAGE: 6

VERIFICATION SUMMARY
PATENT APPLICATION US/09/502,426

DATE: 03/01/2000
TIME: 16:40:56

Input Set: I502426.RAW

Line ? Error/Warning

Original Text
